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Developing a Process to Identify Health Priorities for Translational Research in North Carolina

By

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ABSTRACT

The current health status of the citizens of North Carolina is far from optimal. The state ranks 31st in overall health and 37th in life expectancy (America's Health Rankings, 2015; Kaiser Family Foundation, 2009). Collaborative, innovative approaches are a necessity for public and private organizations interested in addressing public health issues (American Public Health Association, 2016). Translational, academic health research institutions such as the North Carolina Clinical and Translational Sciences Institute (NC TraCS) have a mandate to expedite the delivery of health care solutions to the people they are intended to serve. Furthermore, effectively directing research in a resource-constrained environment is critical (McNulty, Marchenko, & Carter-Edwards, 2016; Rubio et al., 2010; Woolf, 2008). The need to define health priorities has been well established. In the past, the state's health priorities were identified through a stakeholder engaged, qualitative series of town hall meetings (Jones et al., 2012). This paper reports an update of the community-level state health priorities through an alternative approach that relies on existing documentation in the state, namely, Community Health Assessments (CHAs) and Community Health Needs Assessments (CHNAs). Health priorities were extracted from the CHAs and CHNAs using a comprehensive methodology and validated from a research perspective. A systematic review of these documents and comparison to national health statistics reveals that the top five health priorities in North Carolina are obesity, substance abuse, healthcare access, mental health, and chronic disease management. Agreement between the CHAs and the CHNAs is strong, with 100% overlap among the top five

health priorities. Leveraging a comprehensive resource such as the state's CHAs and CHNAs and applying a methodology for setting health priorities such as the one discussed here may help NC TraCS more strategically and effectively work with stakeholders to promote better health. The statewide health priorities represent clear issues that merit further research, and this approach serves as a methodology that should be replicated in the future to both define and ensure the relevance of health research priorities.

GLOSSARY

BRFSS	Behavioral Risk Factor Surveillance Survey, a national survey administered by the CDC
CARES	Community Academic Resources for Engaged Scholarship, one of the cores within NC TraCS
CDC	Centers for Disease Control and Prevention
CHA	Community Health Assessment, a document created by LHDs to assess the health needs of the population for which it is responsible
CHNA	Community Health Needs Assessment, a document created by nonprofit hospitals to assess the health needs of the population for which it is responsible
CTSA	Clinical and Translational Science Award
HCP	Healthy Carolinians Partnerships
IRB	Institutional Review Board
IRS	Internal Revenue Service
LHD	Local Health Department
NC TraCS	North Carolina Translational and Clinical Sciences Institute, one of 60 Clinical Translational Science Awards in the U.S.
NCATS	National Center for Advancing Translational Sciences, one of the centers within the National Institutes of Health
NCDPH	North Carolina Division of Public Health, the central authority that manages LHDs across the state
SCHS	The North Carolina State Center for Health Statistics

INTRODUCTION

Health status in North Carolina

The need for more focused health research and health promotion in North Carolina is evident. As of the 2015 report from America's Health Rankings, the state ranks 31st for overall health in the U.S. Contributors to this low ranking include high infant mortality, health disparities based on level of education, smoking, diabetes, lack of funding for public health, and lack of health insurance (America's Health Rankings, 2015). The state also ranks 37th in overall life expectancy (Kaiser Family Foundation, 2009). The leading causes of death in North Carolina are chronic diseases such as cancer, heart disease, lower respiratory disease (e.g., chronic obstructive pulmonary disease), and cerebrovascular disease. According to the State Center for Health Statistics (SCHS) report, *Vital Statistics, 2014*, heart disease and cancer alone account for 43.3% of deaths in North Carolina, more than the remaining eight of the top ten causes of death combined. Other top-ten health issues include chronic lower respiratory diseases (5.9%), cerebrovascular diseases (5.5%), and Alzheimer's disease (3.8%). The SCHS' *Health Profile of North Carolinians: 2011 Update* also notes "dramatic increases in diabetes and obesity" (p. 1) in the ten years leading up to the report. Additionally, 31.2% of respondents to the 2014 Behavioral Risk Factor Surveillance Survey (BRFSS), a national survey administered by the CDC that captures standard and state-specific risk factor data, reported one or more days in the preceding month during which their mental health was poor (Centers for Disease Control and Prevention, 2014). Working collaboratively to address the state's most pressing health issues is

paramount and a core tenet for public health agencies, public and private (American Public Health Association, 2016).

The North Carolina Division of Public Health (NCDPH) is a central authority in Raleigh that manages 85 local health departments (LHDs) across 100 counties. Each LHD is accredited by the NCDPH independently. Of the 85 LHDs, 79 are responsible for public health services in a single county and 6 cover a wider region of 2 or more counties. The state also includes several major academic health centers, 94 not-for-profit hospitals, and a multitude of other not-for-profit stakeholders with different research interests, goals, and approaches to addressing the health needs of North Carolina. While many and varied efforts exist to address the health needs of the state, they may not always share a common vision. One initiative that aims to bring unity to health goals across the state is the Healthy North Carolina 2020 objectives, a set of goals across the state to improve health and health behaviors, including reducing alcohol and illicit drug use, reducing the number of poor mental health days (the number of days in a month survey respondents reported less than good mental health), and improving outcomes related to cardiovascular disease, diabetes, and colorectal cancer (North Carolina Institute of Medicine, 2011). The 2020 objectives, however, are broad and numerous (including 40 objectives across 13 focus areas), determined only decennially, and largely clinically-focused rather than research-focused. More work is needed, therefore, to help bridge gaps across the full spectrum of health research, implementation, community engagement, and service delivery in the state.

Translational health research

Translational health research is an academic approach that helps clarify health issues and solutions in a way that enables communities to understand and act upon those issues. Translational research means different things to different people; for example, some might consider producing a new drug or device “translational research,” whereas public health oriented researchers may be more likely to investigate whether or not recommended treatments are actually reaching their intended populations (Woolf, 2008). One working definition developed by Rubio et al. in 2010 is that, “Translational research fosters the multidirectional integration of basic research, patient-oriented research, and population-based research, with the long-term aim of improving the health of the public” (p. 4). More simply, translational research means translating evidence-based research findings into everyday practices to directly benefit patients. Given the cross-disciplinary nature of translational research, a need exists for researchers to engage stakeholders directly and respond to health concerns of the general public and health workers in local communities. Translational research aims to keep research efforts and community needs aligned by fostering frequent, direct communications across the spectrum of stakeholders in public health, with trust as a core tenant of successful partnerships (Eder, Carter-Edwards, Hurd, Rumala, & Wallerstein, 2013). Engaging in translational research, therefore, requires a community-driven understanding of what the health needs and issues are not only in terms of statistics but also in terms of how they are perceived by the community.

The NC TraCS Institute and CARES

The Clinical and Translational Science Award (CTSA) program is a national health research funding mechanism administered by the National Institutes of Health (NIH)'s National Center for Advancing Translational Sciences (NCATS) (NCATS, 2016). The CTSA program, launched in 2006, funds 60 research hubs across the country (CTSA Central, "CTSA Central: Home Page," 2016). Each hub has a specific set of research foci that are intended to be complementary (NCATS, 2016). The University of North Carolina (UNC) at Chapel Hill houses one of the three CTSA research hubs in North Carolina, the North Carolina Translational and Clinical Sciences (NC TraCS) Institute. NC TraCS, started in 2008, is a partnership between UNC Chapel Hill, RTI International, and seven other academic institutions and medical centers across the state (CTSA Central, "CTSA Central: About NC TraCS," 2016). The mission of NC TraCS is "to accelerate clinical and translational research from health science to discovery to dissemination to patients and communities" (NC TraCS, "About Us," 2016). NC TraCS has a wide range of research objectives covering topics from biomedical informatics to regulatory topics to education. The organization also offers small pilot grants ranging from $2,000 to $50,000 for community-academic research projects throughout the state.

Within NC TraCS, Community Academic Resources for Engaged Scholarship (CARES) is a core made up of three separate units targeting different aspects of the community-academic partnership. The Stakeholder Engagement unit provides consultation on individual projects (both short- and long-term), facilitates engagement

between providers, researchers, and community members, and works with primary care physicians to improve outcomes (NC TraCS, “Stakeholder Engagement,” 2016). The Research Methods unit assists implementation science investigators, both in grant preparation and with assessment and dissemination of results (NC TraCS, “Research Methodologies,” 2016). Finally, the Training and Outreach unit helps train stakeholders across the community-academic spectrum (including investigators, community members, and clinical staff) in community-based research best practices (NC TraCS, “Training,” 2016). Together, these three CARES units develop different aspects of the community-academic partnership, seeking both to increase trust in academic research and fundamentally change how the partnership works (NC TraCS, “About CARES,” 2016). To achieve their goals, NC TraCS through CARES sought to gain a comprehensive understanding of what the health priorities are in communities across the state.

Local, community-driven health priorities

At least two local, community-driven initiatives exist in North Carolina to help define and shape health priorities. Every 3-4 years, LHDs and hospitals conduct community-based health assessments called Community Health Assessments (CHAs) and Community Health Needs Assessments (CHNAs), respectively. These documents are created by counties and hospitals to assess the health needs of the populations they serve and share findings with the community. Although the documents serve many purposes, the CHAs are a required component of LHD accreditation with the state and the CHNAs are required to maintain 501(c)(3) status with the Internal Revenue Service

(Nelson, Hensey, Matthews, & Rocco, 2015). They are typically 80-300 page documents that are available for download from the NCDPH website or from individual hospital websites. Approximately 94 nonprofit hospitals exist in the State of North Carolina that are required by the IRS to complete CHNAs (Wade & Matthews, 2014).

CHAs are developed by the LHDs and provide an overview of the health factors and outcomes in each county/region. Generally, a CHA includes demographic and socioeconomic data (population information, education, income, employment, crime), health status and outcome parameters (health ranking, leading cause of death, life expectancy, etc.), clinical care parameters (primary care access, uninsured population, screening and prevention, dental services, mental health services), environmental assessment (air quality, drinking water, recreational activities, access to food), health resources and gaps, health priorities, and next steps (typically referring to the dissemination process and creation of implementation plans).

CHNAs are developed by nonprofit hospitals and cover the health needs of the community that the hospital serves. In North Carolina, hospital catchment areas may include patients from more than one county. CHNAs cover topics similar to those of CHAs, however, many CHNAs go into greater depth to describe their local partners (public health department, university departments, other community organizations) that work with the hospitals to document the health status of the community and make improvements. Additionally, service area and population, methodology of the health assessment, existing community resources, resource gaps, access to care, health utilization, priority health issues, and next steps are discussed.

In North Carolina, CHAs and CHNAs provide valuable insight into the health concerns of communities across the state. While these documents are required to maintain LHD accreditation and hospital 501(c)(3) status, they also serve as invaluable strategic planning tools and instruments for increasing transparency for their respective counties and hospitals. Given the community-driven methods used to compile both CHAs and CHNAs and the importance of trust in successful partnerships (Eder et al., 2013), they serve as a natural point at which to begin conversations around community-academic partnerships in translational research.

Prior efforts to establish health priorities for NC TraCS

In 2009 and 2010, Jones et al. (2012), conducted a phased, community-engaged initiative to discover and set health priorities for the state. The goal of the program was to tailor research efforts funded by NC TraCS using health priorities identified by the community. Jones et al. initially identified health priorities by coordinating three regional meetings with Healthy Carolinians Partnerships (HCPs). In the first phase, through a set of initial town-hall style meetings, HCPs were asked to discuss health issues in their community and perceived barriers to addressing those priorities. NC TraCS staff identified the health priorities raised by two or more HCPs who attended these meetings and consolidated them into a list of twelve potential health priorities. NC TraCS staff cross-referenced the list of health priorities with state-level data from America's Health Rankings, the US Census, and the North Carolina Comprehensive Assessment for Tracking and Community Health Systems. Through a qualitative methodological process, Jones et al. (2012) narrowed the list from twelve to seven health priorities that

“reflected a research orientation” (p. 342). The seven health research priorities identified by Jones et al. (2012) were: obesity, mental health and substance abuse, delivery and access to healthcare, youth issues, specific chronic disease (including cardiovascular disease, high blood pressure, stroke, and diabetes), cancer, and injury and violence.

In the second phase, after narrowing the list to seven health research priorities, Jones et al. (2012) coordinated a set of four regional meetings representing 46 of the state’s 100 counties to present findings and solicit feedback on the priorities identified. Through this process, researchers and community members reached consensus on the list of seven priorities and focus areas for those priorities (Jones et al., 2012). While Jones et al. contributed to the important body of literature on the health priorities in the state of North Carolina by clearly engaging stakeholders, two limitations in the approach are that: (a) priorities were not systematically ranked during regional meetings (they were included if mentioned at least twice); and (b) regional meetings did not include stakeholder representation from all 100 counties in the state. As Jones et al. (2012) readily suggest, “[CHAs] present a unique opportunity for NC TraCS to learn about local health needs to inform its research, funding, education, and dissemination agenda” (p. 341). Leveraging information from CHAs and CHNAs in a comprehensive, representative, and methodical way would further the community-driven goals of the work by Jones et al. and create a model foundation for research efforts across the state that better meet the needs of residents.

Project overview and specific aims

As part of a practicum experience in the Public Health Leadership Program at UNC Chapel Hill in early 2016, this author led an effort to develop and assess the information in a database of North Carolina's CHAs and CHNAs. The primary goal of the project was to comprehensively identify and summarize the current, community-driven health priorities and strategies across the state. The research team for the project also included UNC Chapel Hill faculty member Lori Carter-Edwards, Ph.D. and a paid research assistant (RA), Victoria Marchenko. At the beginning of the project, we first familiarized ourselves with the work that had been done in the past, in particular, the work of Jones et al. (2012). We then brainstormed for potential data sources to analyze, reaching out informally to NC TraCS staff members to determine what primary and secondary data sources would best help identify health priorities. Sources mentioned included the Carolina Data Warehouse, the State Center for Health Statistics, the Office of Minority Health and Disparities, the Hypertension Evidence Academy meetings, the North Carolina American Health Education Centers, as well as the county-level Community Health Assessments (CHAs) and hospital-level Community Health Needs Assessments (CHNAs). Since our primary goal was to describe priorities in a way that included comprehensive input from communities across the state, we decided to use the CHAs and CHNAs as our source for health priority data because they were developed with substantial time and effort by local communities. Furthermore, some CHAs and CHNAs referenced other data sources we had identified, which largely precluded the need to reference those sources directly.

The project leveraged CHA and CHNA documents to create an informed and comprehensive picture of all health priorities, including any that may not have been discussed in town-hall meetings in the past. Using the CHAs and the CHNAs in this way is a new and innovative approach to cataloging health priorities that is both comprehensive and community-driven. The specific aims of the practicum project were to:

Aim 1: Create a database of health priorities identified in all current and available CHAs and CHNAs in North Carolina;

Aim 2: Analyze the data collected for the health priorities database; and

Aim 3: Present findings to community stakeholders and conduct a pilot survey to solicit feedback.

The goals of this master's paper are to describe the methodology used to achieve these three aims and to, ultimately, help inform the future direction of NC TraCS' funding proposals and health research activities. The following section details the methods used to achieve each aim.

METHODS

Aim 1: Create health priority database

In their earlier effort to set health research priorities for North Carolina, Jones et al. (2012) relied on regional town hall meetings and did not take into account the CHAs and CHNAs. In 2014, Wade & Matthews compiled a list of all the CHNAs available in the state and provided summary information from a sample of 30 CHNAs the authors

selected from the 72 hospitals they found to have completed both the assessment and the implementation strategy. The sample chosen represented “all areas of the state, from large and small jurisdictions, and from a variety of health systems” (Wade & Matthews, 2014, p. 4). Their work, however, does not include a comprehensive review of all the CHAs and CHNAs available in North Carolina. To the knowledge of this author, no such comprehensive effort to catalog the information available in the North Carolina CHAs and CHNAs had been published prior to this project. After deciding that the CHAs and CHNAs would be our source for data, the research team created a Microsoft Excel ® spreadsheet (Excel spreadsheet) to catalog common themes and priorities identified throughout the CHAs and CHNAs. The spreadsheet included the name, type of data source (e.g., hospital, county, or statewide), the public health issues covered by the data source (e.g., chronic disease, workforce development, maternal and child health, etc.), a qualitative description of the source, and a hyperlink to the data source itself.

We identified links to all county CHAs by navigating to the NCDPH download page for each county’s community health assessment (NCDPH, 2016). All CHAs are available directly via the NCDPH website; it is not necessary to navigate to the individual LHD websites to locate the CHAs. Although not every county in the state has its own health department, LHDs create a CHA for each county individually, except for the Granville-Vance District Health Department that creates a combined CHA for both counties. In total, there are 99 CHAs for the state’s 100 counties, out of which 97 CHAs included health priorities we could clearly identify. After locating the CHAs, we copied

links to each of the CHAs and any supporting documents into the Excel spreadsheet. While the CHAs are available from a central source, the CHNAs are created for local community use via each hospital's website. We were not able to locate a consolidated list of links to hospital CHNAs other than in the earlier work by Wade & Matthews (2014), which did not include CHNAs that may have been published within the past 2 years. To identify the most current link to each available CHNA, we started with the URL available in Wade & Matthews (2014) then navigated to the hospital website to determine if a more recent CHNA was available. In cases where the CHNA could not be easily found via the hospital website navigation links, we used Google© to find the CHNA, if possible. We copied the link to the most recent report for each hospital into the Excel spreadsheet. Some hospitals had a broken link or no link to a CHNA on their public website. In total, we successfully located 83 CHNAs out of the 94 that should be available across the state.

As described in the MPH practicum report for this project (McNulty et al., 2016), the Excel spreadsheet includes the following tabs: (a) Master Database, containing the information extracted from all the county CHAs and hospital CHNAs; (b) Data Dictionary, which lists the definitions of all of the headings within the Master Database and serves as a standard that helps ensure quality (Loshin, 2010); (c) Queries, which contains intermediary summary calculations based on the data in the Master Database, such as frequency, median rank, and county/hospital alignment; (d) Tables, which contains informational tables extracted from the Queries tab in a form that can be

copy/pasted into textual reports; and (e) Charts, which contains informational charts extracted from the Queries tab in a form that can be copy/pasted into textual reports.

The information we extracted from the CHAs and CHNAs included: health priorities; social priorities (i.e., social determinants of health such as education or poverty); special populations; strengths; weaknesses; assets; barriers; and implementation plans (see Appendix A for a full list of column headings). The list of health priorities was built from the priority names listed in the CHAs and CHNAs themselves. Each health priority included its own column heading in the spreadsheet. We manually reviewed each report to locate the prioritized list of health priorities. In the spreadsheet, we entered the rank for each priority as listed in the CHA or CHNA. For example, each CHA would usually list 3-5 health priorities in order of highest to lowest priority. In the database, we included a “1” for highest priority, “2” for second priority, etc. In cases where multiple health issues were identified as the same priority in the document, we gave each the same priority in the database. For example, “mental health” and “substance abuse” were often listed together, and would receive the same numerical ranking in the database in such a case.

Our process included two data quality assurance steps to ensure accurate transcription of health priorities from the CHAs and CHNAs into the database. First, we created definitions for each column heading to ensure that each team member would have a “data standard” with which to interpret the health priorities in the documents in the same way (Loshin, 2010, p. 169). Second, we conducted a “data audit” to verify that our approach to coding the documents was successful (Sollecito & Fendt, 2006, p. 353).

Specifically, we selected a random sample of roughly 10% (n=10) of the CHAs that had already been transcribed by one team member and had another team member review and transcribe those CHAs without seeing the priorities that had been identified by the first reviewer. The two independent reviewers had complete agreement of 85% of what was recorded, then discussed and came to consensus with the remainder of the recorded information. The audit also confirmed that there was no systematic bias in the identified priority ranking between the two coders.

Aim 2: Analyze health priority data

After extracting the data, we developed several informational tables and graphs that updated when the underlying data changed. Our primary measure in analyzing priorities was the frequency of the priority, that is, the number of times that a priority was ranked by a CHA or CHNA, independent of the ranking level. Our secondary measure was the median rank assigned to the priority by those CHAs or CHNAs that listed it (which included the ranking level). Formulas were developed in the Excel spreadsheet to generate tables for the frequency and median rank of health priorities for the CHAs and CHNAs, resulting in two summary tables for the health rankings from all documents. Although many health priorities were identified cumulatively throughout all the CHAs and CHNAs, we limited each table to the top ten priorities according to frequency.

In addition to summary tables, two statewide maps of the top five health priorities were created by NC TraCS Research Assistant Adina Black, one using data from the CHAs and one using data from the CHNAs. To create the map (ArcGIS Online, 2016),

we first prepared a list by county that indicated whether or not each county had included each of the top five statewide priorities on its priority list. In the case of hospitals, we used the county in which the hospital is physically located as the catchment area for that hospital, although noting that many hospitals may serve more than one county. Separate icons were assigned to each of the top five statewide priorities and placed on the map for those counties that listed the priority.

Aim 3: Present findings and solicit preliminary input

To ensure we engaged the community and gathered their preliminary input in the identification of the health priorities from the CHAs and CHNAs, an online stakeholder survey and webinar were implemented. We first began developing the survey questions in an online Excel document (Google© Spreadsheet) that could be easily seen and commented on by all. Once we had reached consensus on the survey questions, we submitted these to Dr. Carter-Edwards for final review and edits. Dr. Carter-Edwards modified the questions and submitted the final version to the Institutional Review Board (IRB) along with our consent form for review. Upon IRB approval, we began creating the survey in SurveyMonkey (SurveyMonkey©, 2016). We elected to use SurveyMonkey because it is a widely available and an easy-to-use, low-cost online tool. The survey consists of a series of virtual pages, including the online consent form; demographic questions; drop-down questions for selecting and ranking health priorities from the list generated from the CHA and CHNA assessment; and open-ended response boxes, including requests for feedback on ways to address the health priorities (see Appendix B). The survey was made available in English and Spanish.

A list of 111 stakeholders as potential survey respondents was compiled and generated by CARES staff. Stakeholders included public health and medical practitioners who were representative of the diverse partnerships NC TraCS has developed throughout the state. Respondent roles included academic researchers (14%), community leaders of formal or informal advocacy groups (47%), health providers (6%), local health department staff (9%), state health department staff (3%), and other/unknown (22%). Respondents were selected from across the state, with approximately 38% of respondents serving the central region of North Carolina, 5% serving the western region, 5% serving the eastern region, 6% working statewide, and 47% with an unknown regional affiliation. The pilot survey was conducted in early April 2016 and respondents were given a 1-week timeline to respond to the survey (in order for the feedback to be used by TraCS leadership at its April 2016 retreat). Stakeholders ideally would have been given more time to respond to the survey, however, the survey was for pilot purposes only and the schedule was limited by the overall timeline of the project. After the conclusion of the survey, the team coordinated a 1-hour webinar with approximately 12 community partners to review the preliminary results from the CHAs and CHNAs and solicit more contextual feedback.

RESULTS

Health priorities

Community Health Assessments (CHAs) were analyzed and the health priorities identified therein were grouped together. Table 1 shows the frequency and the median

rank for the top ten health priorities identified across 97 of the 99 CHAs available for the state. In two of the CHAs, the health priorities were not clearly identified so they are excluded from the analysis. The five most frequently mentioned health priorities (and their median ranks) in the CHAs were obesity (Frequency=50, Rank=1.0), substance abuse (Frequency=50, Rank=3.0), healthcare access (Frequency=41, Rank=2.0), mental health (Frequency=34, Rank=3.0), and chronic disease management (Frequency=33, Rank=1.0). Agreement across CHAs was high with 33-51% of the 97 CHAs agreeing on the top 5 health priorities in their priority lists. The median ranking of all top ten health priorities ranged from 1.0 to 3.0.

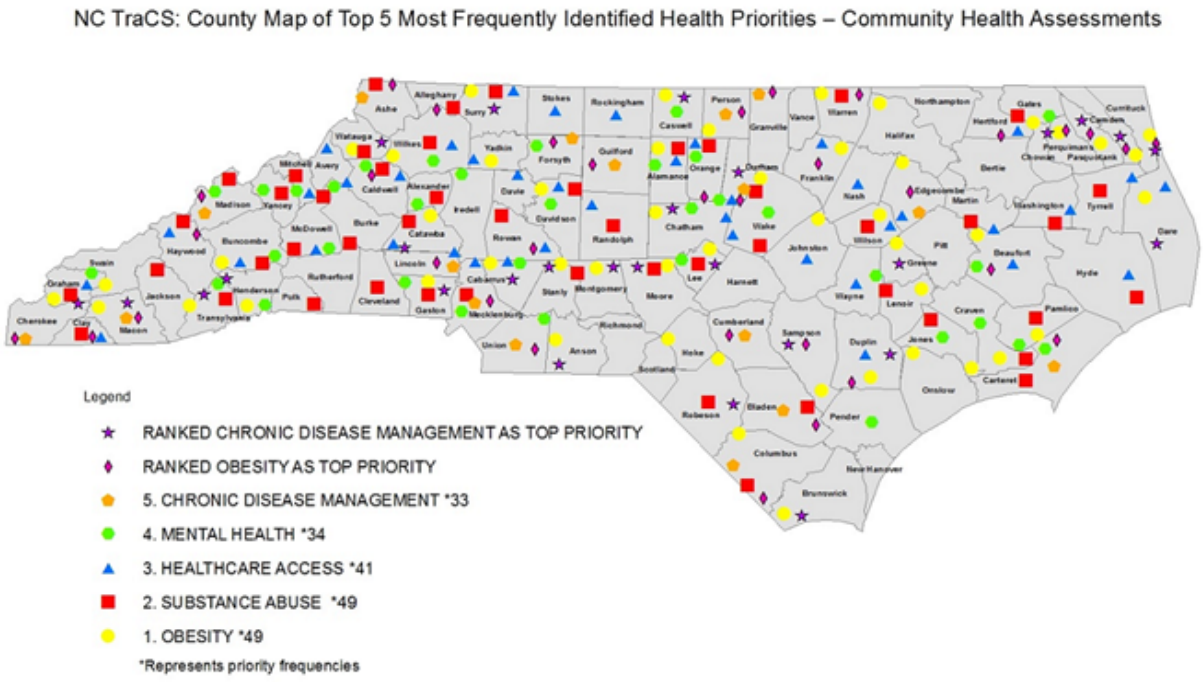
Table 1: Top Health Priorities in CHAs

Healthy Priority	Priority Frequency (n=97)	Priority Rank (median)
Obesity	50	1.0
Substance Abuse	50	3.0
Healthcare Access	41	2.0
Mental Health	34	3.0
Chronic Disease Management	33	1.0
Physical Activity	32	2.0
Nutrition	28	2.0
Cardiovascular Disease / Hypertension	22	1.5
Diabetes	22	2.0
Cancer	20	2.0

The top five statewide health priorities from the CHAs were also mapped to show geographic distribution across the state (Figure 1). Each colored shape indicates that the associated health priority was listed as a priority in that county's CHA. Of note in the

results is that substance abuse and mental health are clustered in higher density in the western portion of the state.

Figure 1

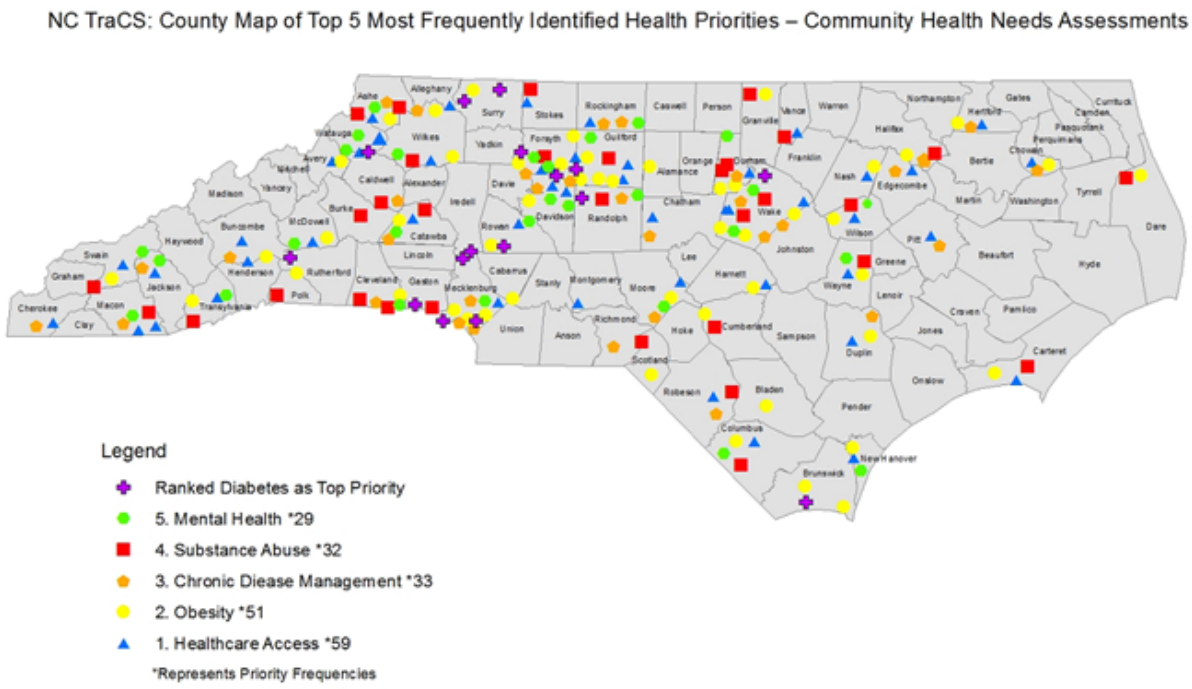


Health priorities identified in hospital Community Health Needs Assessments (CHNAs) were also analyzed. Table 2 shows the frequency and the median rank for the top ten health priorities identified in the 83 CHNAs located across the state. The five most frequently mentioned health priorities in the CHNAs were healthcare access (Frequency=55, Rank=2.0), obesity (Frequency=51, Rank=2.0), chronic disease management (Frequency=33, Rank=2.0), substance abuse (Frequency=32, Rank=2.5), and mental health (Frequency=29, Rank=3.0). Consensus on health priorities was also strong between hospitals, with 35-66% of the 83 CHNAs agreeing on the top 5 priorities.

Table 2: Top Health Priorities in CHNAs		
Healthy Priority	**Priority Frequency (n=83)**	**Median Priority Ranking**
Healthcare Access	55	2.0
Obesity	51	2.0
Chronic Disease Management	33	2.0
Substance Abuse	32	2.5
Mental Health	29	3.0
Diabetes	28	1.0
Cancer	24	3.0
Cardiovascular Disease / Hypertension	24	3.0
Nutrition	23	2.0
Physical Activity	17	2.0

The top five statewide health priorities from the CHNAs were also mapped (Figure 2). The colored shape corresponding to a health priority indicates that the health priority was listed by the hospital at or near that location on the map. Counties may contain more than one hospital and the CHNAs are created by hospitals that may be clustered in areas of higher population density, so the mapped priorities cluster around those areas as well. Since not all counties contain a hospital for which our team was able to locate a CHNA, the lack of health priorities in a county should be interpreted with care.

Figure 2



Stakeholder survey

For the pilot stakeholder survey, we received 24 responses out of 111 invitations sent, for a response rate of 21.6%. Table 3 shows a summary of respondent roles, including the approximate percentages of potential respondents for each role in the original list of survey recipients. “Other” respondent roles included “volunteer / advocate”, “community researcher,” “regional clinic manager of a large hospital system,” “ministry,” “researcher in family medicine,” and “Orange County SHIIP co-coordinator.” Despite the fairly low response rate, actual respondents matched the respondent pool quite well for all categories except community champions; the implications of this discrepancy may need further investigation in the future. Table 4 shows the service

areas identified by respondents. Respondents were well distributed throughout the state with the exception of Western North Carolina, from which we received no responses.

Table 3: Survey Respondent Roles			
Respondent Role	**Response Count**	**Response Percent**	**Respondent Pool (n=111)**
Local Public Health Department	1	4%	9%
State Public Health Department	2	8%	3%
Academic Researcher	5	21%	14%
Health Provider	4	17%	6%
Community Champion	5	21%	47%
Other/Unknown	7	29%	22%
Total	24	100%	100%

Table 4: Respondent Service Areas			
Answer Options	**Response Count**	**Response Percent**	**Respondent Pool (n=111)**
Statewide	4	17%	5%
Western Carolina	0	0%	6%
Central Carolina	12	50%	38%
Eastern Carolina	8	33%	5%
Unknown	-	-	46%
Total	24	100%	100%

Table 5 shows the frequency and median rank of the ten most identified health priorities from the stakeholder survey as compared to the frequency and median rank on the CHAs and CHNAs. Obesity, healthcare access, chronic disease management, cardiovascular disease / hypertension, mental health, and diabetes were the most frequently listed priorities. Frequencies and Median Rankings between the stakeholder survey and the CHAs and CHNAs were highly correlated, with the exception of

Substance Abuse, which was frequently identified on the CHAs and CHNAs but not in the stakeholder survey.

Table 5: Stakeholder Respondent Health Priorities Relative to Priorities from the CHAs and CHNAs						
Health Priority	**Stakeholders (n=24)**		**CHAs**		**CHNAs**	
	# Responses	**Median Rank**	**# Counties**	**Median Rank**	**# Hospitals**	**Median Rank**
Obesity	10	2.5	50	1.0	51	2.0
Healthcare Access	9	2.0	41	2.0	55	2.0
Chronic Disease Management	8	2.0	33	1.0	33	2.0
Mental Health	8	3.0	34	3.0	29	3.0
Diabetes	7	1.0	22	2.0	28	1.0
Cardiovascular Disease / Hypertension	7	2.0	22	1.5	24	3.0
Cancer	3	1.0	20	2.0	24	3.0
Substance Abuse	3	2.0	50	3.0	32	2.5
Tobacco	3	2	12	2.5	8	2.5
Lack of Insurance	2	1.5	1	4	0	n/a

"Other" health priorities identified by the stakeholders included lack of access to multilingual services, oral health, communicable diseases, stress, nutrition, and physical activity. In the open-ended question asking respondents to identify current research gaps, several themes around community engagement and bringing evidence to policymakers arose:

- *"Collaborative efforts between clinics and communities to improve health. The clinics are often unaware of the community resources available to help with preventive and chronic disease management for their patients"*
- *"…connecting evidence with policymakers, funders, and community leaders…"*

- *“How to best reach out and help minority populations; i.e. the Latino community.”*
- *“There's a lot of information out there, but not enough is translated into different languages and not enough is available to minority groups.”*

DISCUSSION

Health priorities aggregated from Community Health Assessments (CHAs) and Community Health Needs Assessments (CHNAs) provide a clear picture of what current health research priorities ought to be in North Carolina. In the 97 CHAs analyzed, the five most frequently mentioned health priorities were obesity (Frequency=50), substance abuse (Frequency=50), healthcare access (Frequency=41), mental health (Frequency=34), and chronic disease management (Frequency=33). In the 83 CHNAs analyzed, the five most frequently mentioned health priorities were healthcare access (Frequency=55), obesity (Frequency=51), chronic disease management (Frequency=33), substance abuse (Frequency=32), and mental health (Frequency=29). The median priority ranking for all of the top five priorities in both the CHAs and the CHNAs was between 1.0 and 3.0. These results are notable for several reasons, including (1) clear leaders arise in terms of the most frequently listed health priorities, and (2) agreement between the CHAs and the CHNAs is strong with 100% overlap among the top five health priorities. While there may be some overlap between the individuals creating the CHAs and the individuals creating the CHNAs in a given region, they are created by different organizations with different strategic purposes and their high correlation helps to ensure their validity as a measure of perceived community needs. Several of these priorities can also be validated via America’s Health Rankings

(2015), which states that North Carolina ranks 26th for obesity and 22nd for poor mental health days. Although a direct comparison is not available for substance abuse, healthcare access, and chronic disease management, the state also ranks poorly in related measures such as drug deaths (21st), lack of insurance (36th), and primary care physicians (27th) (America's Health Rankings, 2015).

NC TraCS and the burden of the state's top health issues

In the related research conducted by Jones et al. (2012), all of the top five health priorities identified through this project were listed as priorities. Mental health and substance abuse were not originally listed as 2009 priorities in the Jones et al. (2012) work; however, they were added in 2010 as a combined research priority that included "access to services, mental health conditions, lack of best practices, healthy relationships, relationship to economic decline, infrastructure, alcohol, illegal and prescription drug abuse" (Jones et al., 2012, p. 343). The CHAs and CHNAs were not used in the Jones et al. work, so the results from this project help contextualize the health research topics originally proposed by Jones et al. (2012). Obesity, substance abuse, mental health, healthcare access, and chronic disease management are clear health issues that must be addressed by the State of North Carolina.

In the United States, cardiovascular disease was the leading cause of death over the 75-year period from 1935 - 2010, and while some progress has been made, more work is clearly needed to reduce the burden of the disease on the country (Hoyert, 2012). Today, cardiovascular disease is still the leading cause of death nationally and the second most frequent cause of death in North Carolina, having caused 17,547

deaths in the state in 2014 (CDC, 2015; SCHS, 2014). Obesity has been shown to be an independent risk factor for cardiovascular disease (Hubert, Feinleib, McNamara, & Castelli, 1983; Van Gaal, Mertens, & De Block, 2006). Effectively addressing cardiovascular disease, obesity, and other risk factors requires a collaborative, population-level effort (Karwalajtys & Kaczorowski, 2010). Public health and translational health research in particular, therefore, are particularly well-situated to direct research efforts that will help reduce the burden of cardiovascular disease and obesity on the state and the country as a whole.

Substance abuse, particularly alcohol abuse and illicit drug use, is an issue of national concern that affects not only adults but today's youth (Lipari et. al, 2013). Since 2014, health insurance plans sold on healthcare.gov have been required to include coverage for substance use disorders; however, the specific services covered are still under consideration by the Department of Health and Human Services (Office of National Drug Control Policy, 2016). In the map of CHA health priorities (Figure 1), it is evident that substance abuse is considered a health issue across the state. Within NC TraCS, there may be a need to increase support and services around substance use and mental health research, including the translation of findings across the state to increase awareness and to identify the best collaborative strategies to address the burden.

Healthcare access is the most frequently listed health priority in the CHNAs and third most frequently listed health priority in the CHAs. The frequency with which healthcare access is identified in both the CHNAs and CHAs and the largely rural nature

of the state (The Rural Center, 2016) indicates that the state still needs better methods for reaching the state's remote or "hardly reached" populations (Sokol, Fisher, & Hill, 2015). Other statewide efforts have previously demonstrated improved healthcare access and quality of care (Szilagyi et al., 2004; Arora et al., 2011). Chronic disease management, also a top five health priority in the CHAs and CHNAs, is closely tied to healthcare access. Many of those without insurance in the US live with one or more chronic diseases and have poorer access to care than their insured counterparts (Wilper et al., 2008). Collaborative, innovative efforts to address the state's healthcare access and chronic disease management needs, possibly in tandem as discussed by Arora et al. (2011), are clearly needed. Treating people with more than one disease may require different efforts than those with a single disease. One potential focus for translational research is understanding how to improve health for people with multiple chronic conditions (Beadles et al., 2015; Volls, Sleath, & Maciejewski, 2014; Domino et al., 2014).

Respondents to the stakeholder survey, who were modestly representative of the 111 potential respondents in terms of job role, also reported obesity, healthcare access, chronic disease management, and mental health as top health priorities. Based on national and state health statistics and health priorities identified in the CHAs, CHNAs, and stakeholder survey, it is clear that obesity, cardiovascular disease, substance abuse, mental health, chronic disease management, and improving access to care should be key priorities for translational research. An innovative, collaborative approach

to translational research is critical in a resource constrained environment, where more cost-effective measures are needed.

Strengths and limitations of the methodology and results

This paper and the project on which it is based have both strengths and weaknesses worthy of discussion. First and foremost, it should be understood that the project was conducted on a compressed timeline with limited staff resources. Two part-time individuals were tasked with reviewing the CHAs and CHNAs and extracting health priorities within two months. This did not allow enough time to assess the focus areas within health priorities nor how different CHAs or CHNAs might place a greater emphasis on certain focus areas. Before these data are used more widely, a larger effort ought to be undertaken to develop focus areas for each health priority based on how the CHAs and CHNAs articulate health priorities for their regions served. Additionally, CHNAs could not be located for all nonprofit hospitals in the state. With more time and staff assigned to the project, it would be valuable to contact the hospitals directly to obtain the missing CHNAs whenever possible. Given the need in translational research to reduce the time taken from research to practice, however, the project team felt it was important to release these results as soon as possible for further study.

The stakeholder survey also presented certain challenges. Due to the short, fixed project timeline and the need to gain IRB approval before sending out the survey, we were able to allot only one week for survey responses. The response rate of 21.6% is on the lower end of response rates for other documented online surveys (Shih & Fan, 2008). Nevertheless, job roles among the 24 survey respondents represented the larger

population of 111 survey recipients well (see Table 3). Although we were not able to obtain areas served for all survey recipients, the data we do have suggest that regions served by the 111 survey recipients were not represented well by actual survey respondents. For example, no survey respondents identified themselves as serving Western Carolina, and a sample size of 24 may be insufficient from which to draw further conclusions. Given more time, it would have been beneficial to conduct the webinar before the survey; at least one respondent did not understand the work that had been performed to set health priorities using the CHAs and CHNAs and wrongly assumed that only the survey would be used to set health priorities. If or when the stakeholder survey is replicated, more time should be provided for survey responses and care must be taken to ensure the whole state, both in terms of job role and region, is represented by respondents.

The major strengths of the project are that, to the author's knowledge, this is the first effort to consolidate the CHAs and CHNAs and comprehensively summarize their findings. Such work is extremely important, as it provides counties and the state with relative information for strategically designing health promotion research and practice efforts. The survey and webinar served as a pilot project for gathering stakeholder input and allowed us to present findings from the CHAs and the CHNAs to a small group of relevant stakeholders. Despite the challenges noted, the project developed a database for further, sustainable exploration of more detailed health priorities data across the state, provides valuable preliminary feedback about the CHA and CHNA results, and

successfully demonstrated that a stakeholder survey is feasible in reaching its intended audience and could be modified to improve response rates in the future.

CONCLUSION

These results, the underlying health priorities database, and the methodology used to create the database may be of value to health research organizations across the state. For NC TraCS and CARES in particular, several implications arise regarding the use of this methodology and its findings. The efforts undertaken by this project supplement the previous efforts by Jones et al. (2012) to summarize health priorities for the state. The results may be pertinent to NC TraCS when determining how to fund translational research or where stronger partnerships may be needed in the state. Using a comprehensive methodology, health priorities have been identified using pre-existing, community-based documentation and validated from a research perspective. As an organization that relies on strong partnerships to help fulfill its mission, leveraging a comprehensive resource such as the state's CHAs and CHNAs and/or a methodology for setting health priorities such as the one discussed here may help improve trust and credibility with stakeholders. Determining exactly how NC TraCS might use these findings is beyond the scope of this master's paper, however, it is hoped that both the methodology and results will be beneficial in NC TraCS' effort to improve the translation of research to practice in meeting the needs of communities in North Carolina.

The primary goals of this master's paper have been met, that is, to describe the methodology used to create and analyze the health priorities database and to conduct a pilot study for stakeholder feedback. The most significant strength of this project is that

it develops a replicable methodology that aggregates information from all the counties and nonprofit hospitals in the state, and it does so by using existing comprehensive documents previously created by each LHD and hospital. Since the existing CHAs and CHNAs are used, no primary data collection is required and the value of creating these documents in the first place is increased. To the knowledge of this author and the entire project team, the CHAs and CHNAs in North Carolina have not been aggregated in this way in the past. It is worth noting that keeping the health priorities up to date is an ongoing process; as counties and hospitals release new CHAs and CHNAs, the health priorities database ought to be updated and this methodology for summarizing findings and setting health priorities repeated, periodically. In this way, the health priorities database represents a decision-making tool that could be used at the state level. The health priorities identified by this project are clear issues for the State of North Carolina that merit further research, and the approach to obtain them represents a methodology that can and should be repeated in the future to ensure the relevance of health research priorities in the state.

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APPENDIX A: DATABASE COLUMN HEADINGS

Top Health Priorities	
	Cardio Disease
	Diabetes
	Cerebrovascular Disease
	Kidney Disease
	Obesity
	Substance Abuse
	Tobacco
	Cancer
	Maternal & Child Health
	Healthcare Access
	Physical Activity
	Nutrition
	Chronic Disease Management
	Communicable Diseases (STDs)
	Mental Health
	Dental
	Other
Top Social Priorities	
	Education
	Poverty
	Homelessness
	Domestic Violence
	Gang Activity
	Crime
	Teen Pregnancy
	Other
Special Populations	
	Children
	Elderly
	No HC Coverage

	Veterans
	English as not a first language
	Geographically isolated
	Homeless
	Special HC needs
	Poverty
	Food Insecure
	Other
Other	
	Strengths/ Areas of Success
	Weaknesses/ Areas of Concern
	Assets
	Barriers
	Recommendations/Strategies/Next Steps
	Year
	Link

APPENDIX B: STAKEHOLDER SURVEY QUESTIONS

- What is your current role in the area or community that you serve?
- In what region do you primarily serve?
- How long have you served in that region?
- Is there one particular county you serve the most?
- If yes, which county?
- Is the county a Tier 1 County (county designated as highly economically distressed)?
- Thinking about the area where you primarily serve, in your opinion, what do you perceive are the top three health priorities? Please rank your first, second, and third choice from the list of priorities below.
- What, if any, are other important health priorities in the area?
- Social priorities are conditions in which people are born, work, live, and grow (e.g., education level, employment rate, physical environment, family support, etc.). These conditions may impact health outcomes for an individual or community. In your opinion, what are the top three social priorities in the area where you primarily serve? Please rank your first, second, and third choice from the list of priorities below.
- What, if any, are other important social priorities in the area?
- Do you think research conducted on this health priority in the past five years has contributed to a greater understanding of ways to improve health in your service area?
- What is the most important research gap that should be addressed to increase understanding of the best strategies and activities to improve health in this priority area? Please explain your response.

- On a scale of 1-10, 1 being the least feasible and 10 being the most feasible, what impact do you think social priorities have on the ability to conduct health research in this priority area?
- Do you think programs or initiatives conducted in the past five years have contributed to a greater understanding of ways to improve health?
- What is the most important programmatic gap that should be addressed to increased understanding of the best strategies and activities to improve health in this priority area? Please explain your response.
- On a scale of 1-10, 1 being the least feasible and 10 being the most feasible, what impact do you think social priorities have on the ability to deliver health programs in this priority area?
- In the past three years, have you read or reviewed at least one County Community Health Assessment or Community Health (or Hospital) Needs Assessment (a county-level health or hospital report of identified strengths, needs, and opportunities for a county)?
- Have you used information from one or more of these assessments to guide the services (volunteered or paid) you provide as a stakeholder?
- Based on the health priorities you listed above, what would you recommend as the most immediate plan of action?
- Any additional comments?